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Director of
Central
Intelligence

~~Top Secret~~

Soviet Chemical and Biological Warfare Program

National Intelligence Estimate

~~Top Secret~~

NIE 11-17-86

August 1986

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THE NATIONAL FOREIGN INTELLIGENCE BOARD CONCURS.

The following intelligence organizations participated in the preparation of the Estimate:

The Central Intelligence Agency, the Defense Intelligence Agency, the National Security Agency, the intelligence organization of the Department of State.

Also Participating:

The Assistant Chief of Staff for Intelligence, Department of the Army

The Director of Naval Intelligence, Department of the Navy

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NIE 11-17-86

SOVIET CHEMICAL AND BIOLOGICAL WARFARE PROGRAM

Information available as of 21 July 1986 was used in the preparation of this Estimate, approved for publication on 15 August 1986 by the National Foreign Intelligence Board.

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SCOPE NOTE

This National Intelligence Estimate reviews the Soviet chemical and biological warfare program, with a view toward establishing judgments about each part of the program and its implications and defining the areas in which our knowledge is incomplete and requires improved collection. The last Estimate that covered both biological and chemical warfare was NIE 11-11-69, 13 February 1969. This Estimate updates SNIE 11/17-2-84/L, 20 November 1984, on chemical warfare and IIM 85-10009, September 1985, on new CBW agents. (S NF)

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KEY JUDGMENTS

The Soviets maintain the world's most comprehensive chemical and biological warfare program, and the Intelligence Community believes this capability constitutes a serious threat to NATO. We believe there is sufficient risk of Soviet use of chemical weapons that NATO must consider such use in all phases of a NATO–Warsaw Pact conflict, even from the outset, in the central region as well as on the flanks, against ships at sea and amphibious forces. We believe chemical warfare (CW) use in any circumstances would, however, be selective rather than massive in terms of the number and type of targets attacked.

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In the early 1970s, the Soviets allocated almost $2 billion on a program to overcome a perceived US lead in CBW and provide a new generation of CBW weapons to be fielded in the next decade, and it appears that the Soviets have maintained and expanded their BW effort.

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The initial use of chemical weapons requires approval by the highest Soviet political authority. Evidence of Soviet planning for the use of chemical weapons in either the nuclear or nonnuclear phases of war is open to differing interpretations. We do believe that an initial decision to use chemical and toxin weapons would be based on an assessment of at least these factors: whether an enemy is capable of and willing to respond with nuclear escalation; whether an enemy is able to retaliate in kind; and the degree to which an enemy can protect its forces against and recover from a chemical attack. These factors would apply to any contemplated attack on NATO, whether in northern, central, or southern Europe.

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The Community remains uncertain of the Soviet perception of NATO's threat to escalate to the use of nuclear weapons in response to chemical attacks, and, thus, cannot confidently predict how effective this would be in preventing the initiation of Soviet chemical attacks during the nonnuclear phase once war began:

— One view is that, although the Soviets probably would refrain from initiating CW if their nonnuclear offensive were proceeding satisfactorily, the possibility of selective use of CW would increase if they calculated that the benefits of such use significantly outweighed the risk of possible NATO nuclear escalation.

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— Another is that, once the threat of nuclear escalation has failed to deter war, it would not deter the use of chemicals any more than it would deter the use of other nonnuclear weapons. Thus, chemical weapons would be used as necessary, limited only by normal military considerations of their utility.

— A third view holds that the dominant considerations would be the certainty of NATO chemical retaliation and the risk of nuclear escalation; consequently, the Soviets are unlikely to use chemical and toxin weapons against NATO, if at all, until a decision has been reached to use nuclear weapons.

We are agreed that if the war reached the nuclear phase, use of chemical and biological warfare (CBW) would be more likely because there could be situations where chemicals would be the weapon of choice.

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The Soviet Union has used chemical weapons in limited wars. They probably would do so in the future when it was to their military advantage against forces unable to protect their personnel, retaliate in kind, or escalate.

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The Soviets have a significant capability to deliver a variety of chemical agents. Chemical munitions exist for aerial delivery and for nearly all Soviet artillery and tactical rocket and missile systems. Direct evidence does not exist that naval surface-to-surface missiles (SSMs) or air-to-surface missiles (ASMs) have chemical warheads.

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We have identified depots inside the USSR where large quantities of bulk chemical agent, decontamination materials, and protective equipment are stored. Storage space at these sites has consistently grown since 1970. The Soviet chemical stockpile is believed to be several times that of the United States (although there is insufficient evidence to precisely describe the types, quantities, or locations of agents.) We believe that chemical munitions are stored (with conventional ammunition) in separately secured facilities at national-level ammunition and select unit depots,

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Chemical munitions are stored in the forward area,

The chemical, biological, and radiological (CBR) protection specialists found in the Soviet armed forces constitute the largest such group in the world, with a peacetime manning of about 30,000 to 60,000 personnel in Ground Force chemical units and 2,000 to 3,000 in Air Force chemical protection sections. The Soviets have expanded their

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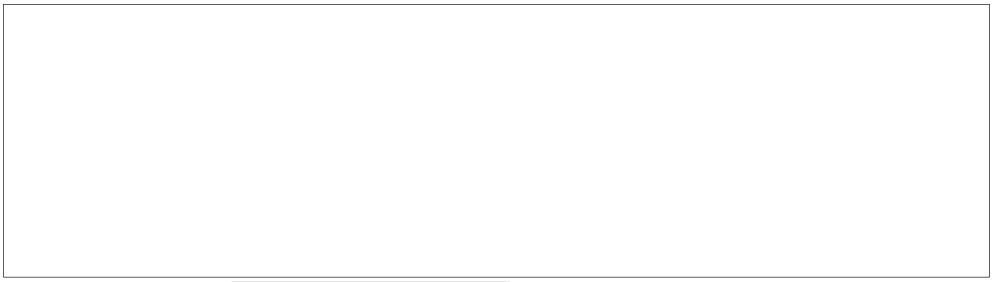
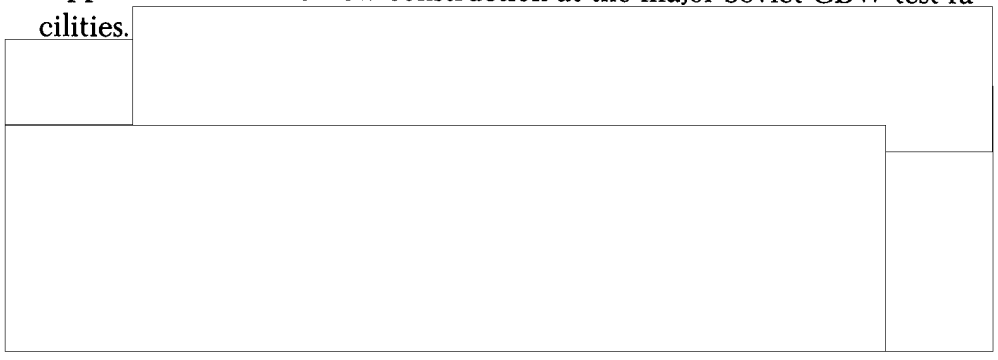
CBR reconnaissance and decontamination capabilities since the late 1970s by introducing new concepts, new organizations, and new equipment. Soviet units regularly train to operate in a contaminated environment. They have occassionally conducted protective training with diluted CW agents, and use all types of protective and decontamination equipment. They have deployed an extensive inventory of CBR reconnaissance and decontamination vehicles, having over 30,000 CBR-related vehicles deployed with chemical troops.

The Soviet Union has the capability to produce CBW agents in the large amounts that would be required for effective military operations. To date, we have identified facilities that could manufacture chemical compounds for use as chemical agents. Only one of these facilities is suspected to have been active a few months each year, probably producing agents at levels sufficient to replenish stockpiles and conduct testing.

We have identified over 100 industrial microbiological plants in the Soviet Union, most doing clearly legitimate research to provide antibiotics, serums, and vaccines. of these facilities, however, appear uniquely designed for assembly and storage of biological weapons, and there is one site that has been identified for just storage.



Since 1980 major improvements to test and support facilities and new construction at the major Soviet CBW test facilities.



The program for the modernization of the Soviet CBW arsenal, which has been ongoing for more than a decade, has concentrated on exploiting advances in biotechnology such as genetic engineering. This

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may, in the next 10 years, result in the fielding of new agents (chemical, toxin, and biological)

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CONCEPTS AND STRATEGY

1. Chemical weapons were used by most of the belligerents during World War I. The first large-scale use of CW was in January 1915 by Germans against the Russians at Bolimow. The Russians suffered the greatest losses from chemical weapons during the war, with total casualties of more than 500,000. Russian fatalities from CW (56,000) were considerably greater than those of all the other belligerents combined and six times larger than any other country. The Soviets made thorough preparations for the possibility of chemical operations in World War II. Despite this, chemical weapons were not used by the Soviets during World War II, nor were they used by any of the other belligerents in Europe. At the end of the war, the Soviets were estimated to have produced large quantities of chemical agents in some 35 newly built and converted industrial facilities. After the war, the Soviets captured German CW agent stocks, as well as technology, and two nerve agent production facilities, which were dismantled and relocated to the Soviet Union.

The Military Utility of Chemical Weapons

2. Chemical weapons are wide-area-effect weapons specifically designed to reduce the combat effectiveness of the enemy by killing or incapacitating personnel and contaminating equipment and terrain. Circumstances in which the Soviets believe chemical munitions provide battlefield advantages over conventional munitions are:

- — Denying areas to potential adversaries through chemical contamination.
- — Causing target neutralization without physical destruction.
- — Enlarging the lethal area.
- — Effectively attacking sheltered targets.
- — Slowing down enemy advances and restricting enemy maneuverability.
- — Rendering enemy equipment unusable until decontaminated.
- — Causing large numbers of casualties when used against unprepared troops.
- — Wearing down enemy troops both physically and psychologically.
- — Requiring fewer munitions to achieve equal lethality.

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3. On the other hand, the Soviets appear to have a healthy respect for the side effects and limitations of chemical weapons. They recognize that:

- — Terrain and weather may reduce the effectiveness of toxic agents and break up or prevent the formation of the secondary toxic cloud.
- — Consideration must be given to the minimum distance from friendly troops that agents may be used.
- — Countermeasures can be taken on short notice and, if properly implemented, could significantly degrade chemical weapons effectiveness.
- — Operations in a protective posture are restrictive.

CW Use During World War II

Chemical weapons were used by several countries in the conflicts leading up to World War II. In the European theater, the British, French, and Germans agreed in September 1939 to refrain from the use of CW, though the available stocks of chemical weapons exceeded the total quantity of chemical weapons used in World War I. Germany had developed nerve agents during the late 1930s, though they did not have large stocks of these weapons until 1944. They refrained from using their other chemical weapons because they feared retaliation against their civilian populations. The Germans also mistakenly believed the United States had developed nerve agents, though the Western Allies did not know of the German capability until 1944 when tabun-filled ammunition was captured. After that time the Allies were reluctant to consider the use of chemical weapons since they did not have nerve agents. Stocks of chemical weapons were available in every major battle area. Throughout the conflict, both the Allies and the Axis believed their enemies had equivalent capabilities to protect their forces and to retaliate in kind. Though chemical weapons could have had a significant effect on the outcome of certain battles, all sides refrained from initiating CW because, at each point where such use was considered, sufficient disincentives existed.

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— Chemical contamination of the battlefield could slow the pace of operations for both sides, which the Soviets believe in some cases could assist a defender.

— Chemical weapons employment increases the complexity of planning and executing offensive operations.

4. On balance, selective use of chemical weapons could be a significant combat multiplier causing limited degradation on the effectiveness of Soviet forces. Clearly, Soviet forces would prefer not to operate in a nuclear, chemical, or biologically contaminated environment. They must consider the interference with operations that would be engendered by use of chemical weapons. The Soviets would prefer weapons whose effects are more predictable, but have derived formulas, nomograms, and tables to determine contamination effects from the use of a particular agent under given meteorological conditions and terrain. Soviet writings reflect that the zones of contamination resulting from the use of chemical weapons are smaller than those resulting from the use of nuclear or biological weapons, and, thus, are easier to bypass. However, intentional wide-aerial spraying of persistent agents may, in fact, create larger areas of contamination than use of low-yield nuclear weapons. All these are considerations for any military force that contemplates operating in a contaminated environment. The Soviets have trained their forces to maximize their combat capabilities and minimize the inherent difficulties of operating in a chemical or nuclear-contaminated environment.

5. The Soviets stress taking advantage of the weaknesses of any enemy's protective capability such as exploiting known deficiencies in enemy individual protective means and capitalizing on the failure or inability of the enemy to detect contamination. The ability to achieve surprise, the status of the enemy's protective posture, and the enemy's combat restoration capabilities are keys to determining the potential effectiveness of a chemical strike. The Soviets believe chemical weapons are most effective against poorly trained, unprepared, and unprotected personnel. They anticipate a casualty rate of up to 60 percent with a CW attack against unwarned and unprotected personnel and 15 to 40 percent among protected personnel (because of exposure to CW agent before masking, malfunctioning equipment, and combat damage to protective equipment). Soviet actions in using chemical protective equipment indicate a potential capability to restore combat potential and minimize casualties.

6. While the Soviets consider enemy nuclear weapons systems to be the most important targets, concentrations of personnel are the most vulnerable to chemical attacks. The target array for chemical attacks could include any of the following: nuclear delivery systems; airfields; command, control, and communications sites; ports; air defense assets; key logistic centers; naval bases; and other key rear area facilities within the tactical and operational tactical depth of the battle area. Although the Soviet's writing before World War II emphasized that CW was intended primarily to achieve tactical battlefield advantages, their present combination of delivery systems provides the capability to deliver chemical strikes throughout the operational and operational-strategic depths of the enemy's defenses.

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7. Soviet policy, as officially stated, is that it will not initiate chemical warfare. Soviet exercises often depict NATO chemical strikes, usually in conjunction with nuclear strikes. A major consideration by the Soviets in deciding whether to use chemical weapons is the risk that their enemy will retaliate in kind or, in the case of NATO or China, escalate to the use of nuclear weapons. If the Soviets calculated they could achieve significant benefits at what they considered an acceptable risk, they might use chemical weapons during a war with any country.

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9. Successful Soviet attacks (including those with chemical weapons) on high-value NATO targets would threaten NATO's capability to execute its wartime mission, and, thus, make it even more difficult for Soviet planners to identify the level of conflict below which NATO would not be provoked to respond with nuclear weapons.

We believe the massive use of chemical weapons is unlikely, because the Soviets would calculate that such use would be almost certain to cause a NATO nuclear response, while other available means may have a better possibility of avoiding nuclear response. Once war has begun, Soviet concerns about nuclear retaliation might be lessened, and we cannot rule out selective employment of chemical weapons.

Current Policy Regarding Employment

10. Chemical weapons employment requires authorization from the highest military-political levels in the USSR. The decision to release chemical weapons for employment rests in the hands of the Politburo or, in wartime, the Supreme High Command. The decision to release chemical weapons for employment would probably be on the basis of at least the following considerations:

- An assessment of the probable enemy response, either retaliation in kind or with nuclear weapons.
- An assessment of the military advantage of CW against a particular enemy.
- An assessment of the enemy's ability to protect its forces against chemical attack and to restore its combat capabilities following the attack.

11. Once release to employ chemical weapons has been granted, the Soviet General Staff, the executive agent of the Supreme High Command, implements the decision and determines how chemical warfare will be integrated into the overall operation. The plans developed by the General Staff are disseminated to each Theater of Military Operations (TVD). The High Command of each TVD, in turn, disseminates chemical warfare plans to subordinate front, army, and division commands. At each command level, the appropriate fire plans for the employment of chemical weapons are developed by the fire planning staffs.

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Possible Chemical Warfare Tactics

12. To avoid a decrease in the tempo of offensive operations, the Soviets might use persistent CW agent on the flanks, in sectors that will be bypassed, or deep in the enemy's rear area. Although the Soviets do not doubt their ability to cross such regions, they would prefer to bypass areas of contamination. Nonpersistent agent attacks could be delivered along the main axis of advance without disrupting the tempo of offensive operations. Because of the short duration of their effects, Soviet forces could either wait until the agent dissipates or attempt to cross the contaminated area using vehicle protective systems, with little preparation needed for protection and virtually no need to decontaminate.

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13. To enhance the effectiveness of chemical weapons, the Soviets may employ chemical weapons simultaneously with nonlethal smoke. If CW employment can thus be disguised, enemy personnel may not have sufficient warning to don protective masks and clothing. The Soviets may employ chemical weapons simultaneously with, or immediately following, high-explosive or improved conventional munition barrages, to take advantage of the confusion and degradation of the enemy's protective posture.

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Special Operations

14. Limited evidence suggests that Warsaw Pact special-purpose (Spetsnaz) reconnaissance forces could use chemical or biological weapons in operations behind enemy lines.

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15. Some types of CBW weapons are relatively easy to transport and could be effective if used without warning by Spetsnaz groups operating in the NATO rear area against targets such as command posts or special ammunition storage sites. In considering whether to authorize such operations, however, we believe Soviet leaders would be reluctant to risk opening a weapons-of-mass-destruction phase unless the payoff for chemical use was substantial. Additionally, the use of lethal CW by such forces presents formidable command and control problems for the Soviets, and, we judge that, on balance, the Soviets would not resort to widespread use of CW by Spetsnaz forces unless a decision had already been reached for employment of CW using other, more efficient methods of delivery (such as aircraft and surface-to-surface missiles). The use of disabling, nonlethal chemical agents in isolated instances is more likely, but there is no recent, direct evidence that the Soviets plan such use for Spetsnaz forces.

Nonnuclear Warfare

16. Soviet military doctrine since the late 1970s appears to be that an initial period of combat with NATO, in which the Pact would seek to degrade NATO's theater nuclear capability, might be limited to the use of conventional weapons. This initial period is referred to by the Soviets as the nonnuclear phase of war.

17. In a war with NATO, the Intelligence Community cannot rule out Soviet initiation of CBW even from the start of nonnuclear hostilities. The Soviets probably believe that NATO's forces are relatively less capable than their own for operations in contaminated environments. Given their access to Western information, the Soviets must be aware that NATO's ability to retaliate in kind has diminished since 1969. Nonetheless, they also remain concerned with a presumed US ability to rebuild an offensive chemical stockpile during the period of tension leading to war.

18. Because there is little evidence as to what specific conditions would prompt the General Staff to recommend, and the political authority to approve, the use of CBW against NATO, questions of when and under what conditions the Soviets might do so during the nonnuclear phase of war can be answered only inferentially. Since we remain uncertain of the Soviet's perception of NATO's nuclear escalatory threat, differing views exist on how effective this would be in preventing Soviet first use of chemical warfare once war had began:

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- One view is that, although the Soviets would probably refrain from initiating chemical warfare if the nonnuclear offensive were proceeding to their satisfaction, the possibility of selective use would increase if they calculated that benefits of such use significantly outweighed the risk of possible NATO nuclear escalation; for example, a serious Warsaw Pact reversal or the prospect of a significant effect because of weaknesses in NATO's protective and deterrent posture.

- A second view is that, once the threat of nuclear escalation has failed to deter war, it would not deter the use of chemical weapons any more than it would deter the use of other nonnuclear weapons. Thus, chemical weapons would be used as necessary, limited only by normal military considerations of their utility. Chemical warfare can be separated from nuclear warfare and must be considered in that perspective. A nonnuclear scenario makes a compelling argument for the selective use of chemical weapons in the initial period, if such weapons offer significant potential for achieving their objectives in a timely manner without resort to nuclear escalation at the onset. Chemical weapons would most likely be integrated into initial Soviet operations if they could be employed in ways that contributed to the immediate neutralization of NATO's retaliatory theater nuclear capability, interrupted NATO's command and control network, or disrupted the continuity of NATO's forward force deployment, enabling Soviet combat forces to retain the tactical and operational initiative. In a nonnuclear scenario, Soviet military strategists are more likely to view chemical weapons as offering a solution to those critical military problems that reduce the risk of theater nuclear war and strategic nuclear escalation and contribute to successful conclusion of military operations in the shortest possible time.

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- A third view holds that the dominant consideration in a decision to use chemical and toxin weapons against NATO would be the certainty of NATO chemical retaliation and the risk of nuclear escalation. Further, the Soviets believe the risk of escalation exceeds any potential benefit that

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could be derived from use of the current chemical and toxin inventory. In this view, the USSR's chemical and toxin capability exists primarily to deter NATO use and further ensure that the Warsaw Pact's massive conventional superiority would be decisive. Consequently, the Soviets are unlikely to use chemical and toxin weapons against NATO, if at all, until a decision had been reached to use nuclear weapons.

Nuclear Warfare

19. Limited evidence referring to chemical warfare in the context of a particular phase of war portrays Pact chemical strikes simultaneous with or subsequent to nuclear operations. This evidence indicates that they would employ chemical weapons to complement their nuclear munitions, or to neutralize certain sensitive targets immediately before a Soviet nuclear strike. Certainly, at this point, fear of NATO nuclear retaliation was not and would not be a restraining factor.

Ships at Sea and Amphibious Operations

20. The Soviets have provided for chemical citadels on their ships and have emphasized washdown systems (both of which are equally applicable to nuclear fallout protection). They maintain chemical bombs with at least some of their naval aviation units and have chemical weapons storage at some naval bases. We assess that some of their terminally guided cruise missiles are capable of delivering CW agents, and naval CW gun ammunition has been reported. Chemical service personnel are assigned to all Soviet combatants. The Soviets might perceive the selective use of chemical warfare to be advantageous against ships at sea; however, all available evidence indicates that the use of weapons of mass destruction at sea would not be independent of their use on land. Regarding amphibious operations, Soviet writings have indicated that personnel engaged in heliborne and surface amphibious assaults would be especially vulnerable to nuclear and chemical strikes.

Outside NATO Central Region

21. The bulk of the available evidence pertains to Soviet use of CW against the central region of NATO. However, the considerations for the use of CW apply equally to NATO's flanks. As in the central region, the Soviets store chemical weapons opposite Scandinavia for possible use. Soviet forces facing NATO's flanks are equipped and trained for operations on a contaminated battlefield. Terrain in Norway and eastern Turkey would be conducive to the use of CW. 25X1

22. In peripheral areas outside the NATO region, only China has the ability to retaliate with chemicals or escalate to the use of nuclear weapons. The USSR probably plans for the contingency of Pakistani and Iranian CW capabilities. The Soviets maintain chemical depots in the regions encompassed by the wartime Southern and Far Eastern TVDs, and their forces in these areas are trained and equipped for operations on a contaminated battlefield. The inability of these countries to retaliate in kind, or escalate, and their weak protective capabilities may invite the use of CW by the USSR. While we know very little about Soviet views of using CW against the PRC, the wide-scale use of these weapons during a Sino-Soviet war for the purpose of offsetting the Chinese manpower advantage is a possibility. 25X1 25X1

Proliferation of Chemical Warfare Capabilities

23. In the 1980s, international concern about the use and proliferation of CBW in the Third World increased. Although the Soviets are concerned about certain aspects of proliferation, there have been several examples of Soviet activities related to the transfer or use of CBW over a long period of time. During the 1960s, Egypt was reported to have received Soviet CW technology. By 1962, the USSR had provided Egypt with more than 250 tons of nerve agent and chemical bombs filled with phosgene and mustard. Some of these chemical weapons may have been used against Yemeni tribesmen during the period 1963-67. Soviet involvement with the Egyptian program ceased in the early 1970s when the Soviets were expelled from that country. 25X1

24. In the early 1960s, the USSR provided Syria with extensive defensive training and protective material. Syria first obtained chemical weapons in 1973, when Egypt provided sarin-filled bombs and artillery shells and the USSR provided at least riot-control agents. In the late 1970s, the Syrians reportedly developed and tested a chemical warhead for the Scud missile; however, there is no indication that the Soviets assisted in this effort. We have no evidence of Soviet assistance to Syria's offensive CW program. Moreover, Syria has attempted to conceal the existence of its program from the Soviet Union from its inception. 25X1

25. The USSR provided toxins and, possibly, other chemical weapons to the Vietnamese beginning in the

mid-1970s. Toxin agents and an unidentified incapacitating agent have been used by Vietnamese troops against H'mong resistance forces and civilian populations in Laos. Similarly, chemical agents and toxins have been used by Vietnamese forces in their attempt to conquer Cambodia. In late 1979, a US team of medical and CW experts investigating reported use of CW by Vietnamese and Laotian forces against the H'mong concluded one type of chemical employed was probably a nerve agent. The Soviets reject US charges about toxin weapons being used in Southeast Asia. Although reporting of attacks persists, the number has decreased since 1984. We have been unable to confirm these attacks. It is probable that Soviet advisers still assist the Vietnamese and Lao.

26. The Soviets employed chemical weapons in Afghanistan at least during the first years of the war. Reporting of attacks decreased sharply afterwards. Unconfirmed reporting suggests the Afghan Army may have used chemical agents provided by the USSR. However, it is extremely unlikely that the Soviets provide lethal agents to the Afghan military. Soviet and Cuban advisers have reportedly trained Ethiopians in offensive chemical warfare operations. Ethiopian forces, aided and supervised by Soviet advisers, may have used lethal chemical agents in selected attacks on Eritrean resistance forces, although we have yet to acquire proof of such attacks.

27. Recent information has indicated some Soviet views on CW proliferation:

— The Soviets state they are as concerned about CW use and proliferation as Western governments.

— Charges of Soviet treaty violations are countered by a broad-based propaganda program accusing the United States of past uses of CBW (Korea, Vietnam, and Cuba), as well as current allegations of supplying CBW materials to South Africa, insurgents in Afghanistan, and El Salvador.

— US CW modernization continues to be emphasized in Soviet propaganda as proof that the United States is not serious about a global CW ban or stopping CW proliferation.

— Because of the proliferation of CW capabilities throughout the world, the Soviets may calculate that the traditional abhorrence to chemical warfare is slowly being eroded as an increasing number of countries use or attain a capability to use CW without any major political or economic sanctions from the world at large. This perception may influence Soviet CW doctrine concerning the proper circumstances and times for the use of CW in Third World conflicts.

Arms Control: Negotiation and Monitoring

28. Presently, the Soviet Union is engaged in multilateral negotiations on a comprehensive ban on chemical weapons at the Conference on Disarmament (CD) in Geneva and in bilateral discussions with the United States on the margins of the CD. Problems in identifying CBW agent production and storage facilities, as well as calculating weaponized stocks, make monitoring of international agreements limiting CBW-associated stocks or production extremely difficult. The security that surrounds the Soviet CW program makes monitoring of compliance even more difficult. The Soviets accept the principle of on-site inspection of destruction of stocks, but appear unwilling to declare the location of stocks until just prior to destruction. The Soviet position on CW production appears to reflect concern about where at least some of their facilities are located; for example, as part of a large chemical complex, and what specific CW equipment must be destroyed or salvaged.[1]

[1] See *Soviet Noncompliance With Arms Control Agreements*, 23 December 1985, NSC Arms Control Verification Committee. (U)

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CHEMICAL WARFARE PROGRAM

29. We believe that the Soviets maintain a warm-base production capability devoted to chemical agent production as part of their industrial base. This operates in different modes and at irregular intervals to replenish the stockpile and supply agent for munitions.

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Chemical Warfare Production Facilities

31. The Soviet civilian chemical industry has the ability to produce chemical agents in large quantities. In addition to dual-use chemicals such as phosgene and hydrogen cyanide, which are produced in quantity, the Soviets have pesticide plants that can be modified rapidly to produce nerve agent, binary components, or advanced intermediates. These modifications are relatively simple to implement, and could be completed in a matter of weeks. Change of chemical feedstock, rather than process equipment changes, would probably require the longest leadtimes.

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Storage Facilities

32. We have identified chemical depots used to support the armed forces these depots probably are controlled by the Chief of Chemical Troops, and some may be national-level installations. These depots are believed to be the principal storage centers for bulk chemical agent, as well as large quantities of CBR-related equipment, vehicles, and smoke and incendiary materials Other chemical depots exist that appear to be associated with these major depots.

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33. Although small quantities of agent probably are available for training, we believe that bulk agent is not routinely stored at Ground and Air Force unit depots. Reports on chemical agent storage in the non-Soviet Warsaw Pact (NSWP) suggest that chemical agent would normally be under Soviet control.

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Chemical Munitions Storage

34. We believe that chemical munitions are stored (with conventional ammunition) in separately secured facilities at national-level ammunition and select unit depots

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[redacted]

Chemical Munitions

35. Chemical munitions exist for aerial delivery and for nearly all the Soviet artillery and tactical rocket and missile systems. Direct evidence does not exist that naval SSMs or ASMs have chemical warheads. Evidence suggests that CW landmines are available. We do not know the extent or amount of chemical munitions stored in the forward areas and under control of the NSWP forces, but believe that, except for Romania, non-Soviet Warsaw Pact countries control chemical agents sufficient only for R&D and training. On the basis of Soviet preservation technology, [redacted] and Soviet conventional munitions storage practice, stored CW bulk agent and munitions are probably in good condition; however, we cannot exclude the possibility that some deficiencies do exist. [redacted]

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Chemical Weapon Stockpile

36. We believe that the Soviets maintain a stockpile of chemical ammunition sufficient to supply their forces during wartime, [redacted]

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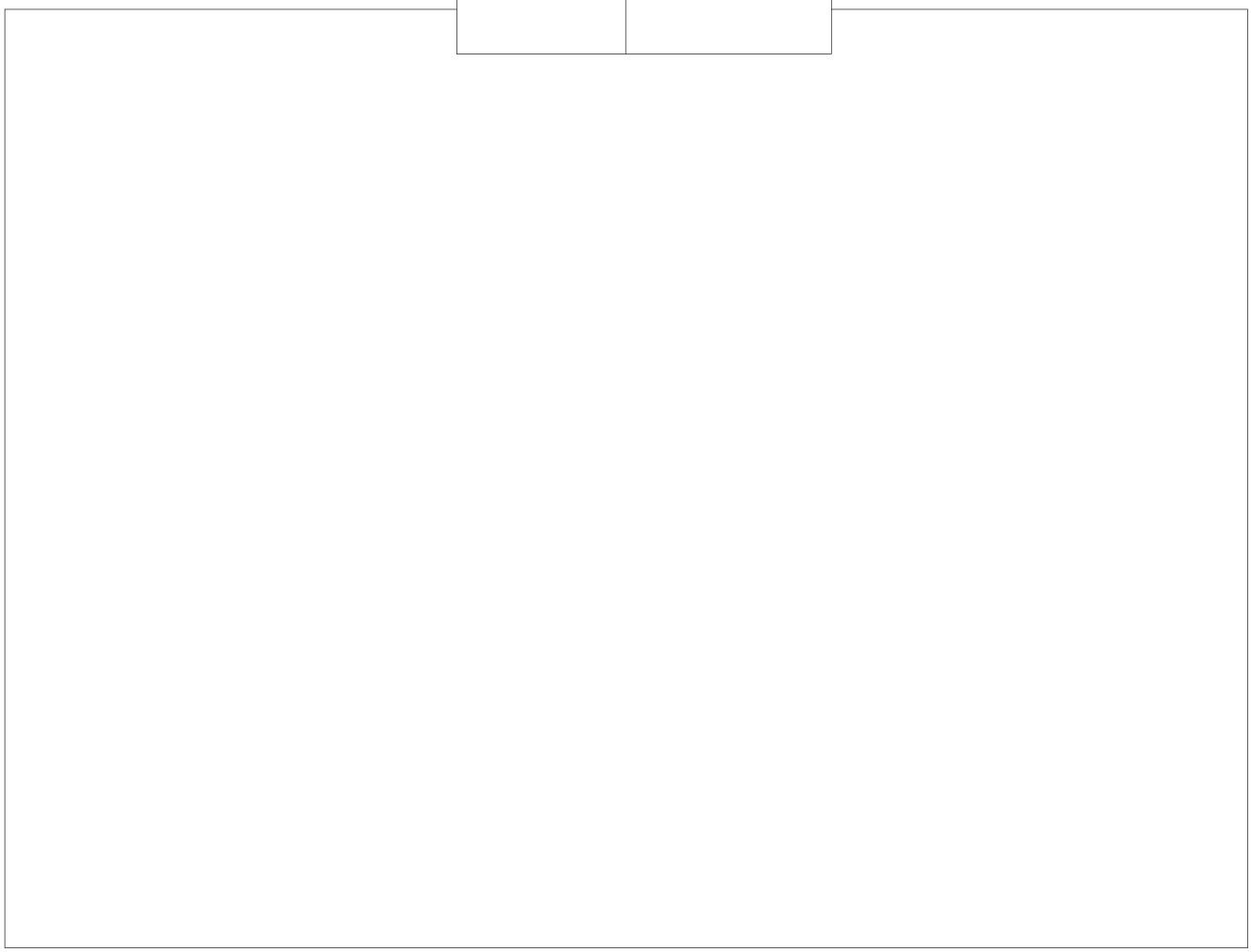

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Protective Capabilities

39. The Soviet armed forces have a large variety of items designed to provide protection from the effects of CBW warfare. They have protective masks and agent-impermeable protective clothing, agent detectors, decontamination devices and prophylactic kits, and air filtration systems for shelters and vehicles. While not yet reported to be in the active inventory, a new protective mask resistant to the next generation of Soviet CW agents is probably in development. A new Czechoslovak airpermeable protective suit indicates continued development of protective measures. Decontamination practice seems to be driven by the concept that partial treatment is sufficient in most instances, although a new generation of agents may require new decontaminants (figure 6). New developments in collective protection filtration systems include the use of minimal filtration systems that would allow for reduced but acceptable individual protection levels for more personnel. Past equipment development cycles indicate the probable appearance of these additional protective items in the 1990-95 time frame. Over 30,000 CBR-related vehicles are deployed with chemical troops.

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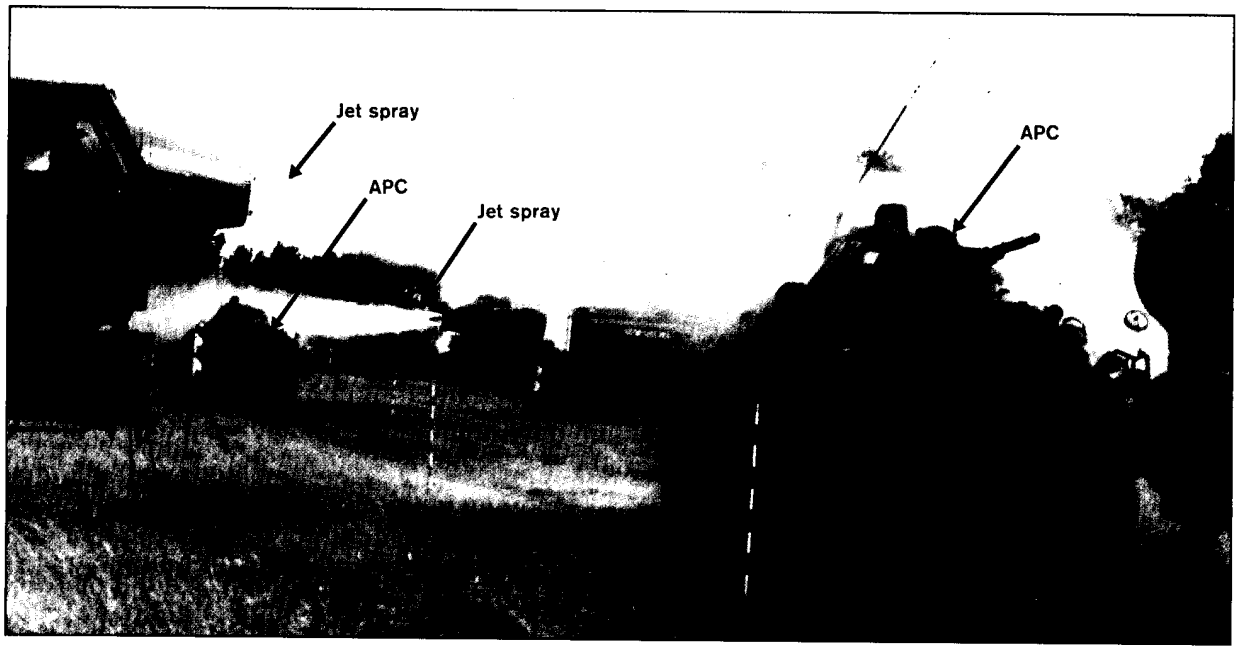
Figure 6
Equipment Decontamination Exercise



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Protective Force Structure

40. Soviet Chemical Troops, which are found in all branches of the armed forces, are dedicated to the protection and decontamination of troops and equipment from the effects of weapons of mass destruction. The Directorate of the Chief of Chemical Troops, subordinate to the Ministry of Defense, is headed by Colonel General of Chemical Troops V. K. Pikalov. This directorate establishes force structure, training, and doctrinal requirements, and pursues research, training, and maintenance functions. Units and individuals assigned at division level and below are referred to as the Chemical Service, while those at army level and above are referred to as Chemical Troops. Their principal wartime tasks include:

- — Conducting CBR reconnaissance.
- — Locating nuclear bursts.
- — Assessing the parameters of CBR contamination.
- — Monitoring the level of contamination of troops, equipment, materiel, and terrain.
- — Decontaminating troops, equipment, buildings, and terrain.
- — Employing smoke generators, flame, and incendiary devices.
- — Providing detection and decontamination support to accidents resulting from the movement of chemical weapons.

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41. With the exception of the employment of smoke, flame, and incendiary devices, Chemical Troops are protective in nature and are not involved in the technical aspects of the offensive delivery of nuclear or chemical weapons. Nuclear and chemical fire-planning responsibilities rest with other staff elements.

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42. Chemical Troops are organic to Soviet and Warsaw Pact Ground Force units at all levels from

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front to regiment. The Soviet military has experimented with the organization of these units several times during the past two decades, the last time beginning about 1980. At that time, division-level units were reorganized from battalions to companies, and regimental-level units from companies to platoons. We also have evidence that, at about the same time, army-level units underwent a reorganization. Whereas armies previously had one chemical protection battalion, we now find that they have up to six specialized battalions and companies (observed in several combinations forcewide). We also have evidence that some front-level chemical protection brigades have been augmented by a variety of independent battalions. The introduction of aerial CBR reconnaissance units and specialized nuclear-burst locating units give the Soviets the capability to rapidly locate contaminated areas.

43. According to unclassified Pact writings, the reorganization at the tactical level was designed to make more units capable of independent CBR reconnaissance and decontamination. At army level and above, we believe this reorganization and concentration may provide the Soviets with greater flexibility in using their assets in wartime. It is difficult to determine how successful the Soviets have been in achieving the goals of this reorganization, but the extent to which it has been observed throughout the USSR and the fact that it is now being observed in NSWP forces lead us to assess that the Soviets believe it has improved the ability of their forces to continue operations on a contaminated battlefield. Our estimate of the peacetime manning of the Ground Force Chemical Troops is about 30,000 to 60,000 personnel. In wartime, the mobilization of reservists may at least double that figure.

Soviet Air Forces

44. The Air Technical Battalions of Soviet airbases have chemical protection sections to perform reconnaissance and decontamination. Each section operates under the staff supervision of the Regimental Chief of Chemical Service, who is also responsible for supervising the chemical protective training of airbase personnel. The Soviet Air Force (SAF) is believed to have between 2,000 and 3,000 personnel in these units. In wartime, previously trained elements of the Air Technical Battalion would augment the chemical protection section to assist in decontamination. If further manpower is required, the airbase can request support from Ground Force chemical units in the area.

Soviet Strategic Rocket Forces (SRF)

45. indicates the existence of a Chemical Protection Company, similar in composition to those in a Ground Forces division, in SS-20 divisions. The unit acts as a protection unit with routine missions of CBR decontamination and reconnaissance. All or most other missile divisions of the SRF are also assessed to have a CBR protective capability.

Soviet Navy

46. The Soviet Navy Chemical Service Directorate is under the command of a rear admiral who is directly subordinate to the Chief of the Main Navy Staff. The Soviet Naval Chemical Service Directorate is responsible for the Naval Chemical Service organizations within each of the four Soviet fleets. The Fleet Chemical Service is also responsible for training and providing protective equipment for CBR operations. A smoke unit has been noted in the fleet structure and large numbers of smoke-generating vehicles are located at most Navy Chemical depots.

Offensive Force Structure

47. Chemical weapons employment is a facet of fire-support planning that is executed with fire-support assets. The basic command and control organization at front and army level for all fire support is the Combined-Arms Combat Control Center (CCC). In the front- and army-level CCC, the combined-arms commander and his principal advisers plan and coordinate the major aspects of the operation, including employment of nuclear and chemical weapons. Included in the CCC is the combined-arms commander, his chief of staff, and the key members of his staff representing all major functional areas. Operational or strategic planning (depending on the level of the CCC) on a general level occurs at the CCC. Detailed fire planning, control, and coordination of fire-support assets is the responsibility of the Joint Air and Air Defense Command Post and the Command Post of the Chief of Missile Troops and Artillery.

48. The chemical plan would be determined by the nuclear and fire-planning group, with the detailed computations being performed at the artillery or air Command Post, depending on the delivery system being employed. The Chief of Chemical Troops would provide information to the CCC on a chemical (radiological) situation map, depicting areas of contamination resulting from both enemy and friendly use of chemical and nuclear weapons.

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Protective Training

49. CBR protection training is a fundamental aspect of Soviet military training for all services. It involves a variety of measures for the protection of personnel in all services from the effects of nuclear, chemical, and biological weapons. This includes nuclear/chemical reconnaissance; nuclear/chemical monitoring; and the decontamination of personnel, equipment, vehicles, and terrain because of contamination. Field training and classroom instruction address many aspects of these measures. Individual chemical protection training occurs on a regular basis and covers the use and care of protective clothing, the effects of CW agents, detection, decontamination techniques, and emergency measures following exposure to chemical agents or radiation. Field training exercises and command post exercises involving all types of combat units regularly feature chemical defense. Chemical protection training is conducted in a variety of combat situations, at different times of day, year round. These exercises gauge the abilities of the commander, his staff, and subordinate units to overcome the effects of a specific CW agent. These exercises add realism to training, and prepare participants for a specific type of contamination and the measures that need to be taken for protection. Certain paramilitary organizations such as the Merchant Marine and Civil Defense units also regularly receive CBR training.

50. Chemical protection training is not a deception measure used by the Soviets to conceal preparations for offensive CW use; chemical protection measures are neutral in that contamination may be the result of a friendly or enemy chemical strike. Reports indicate that the defensive training occasionally uses live chemical warfare agents. This usually involves personnel, equipment, and units of the Chemical Troops conducting chemical reconnaissance; however, combat arms unit training has also reportedly involved the use of live chemical warfare agents. Fire-support elements (MRL, artillery, and SSM) are trained similarly. Personnel are trained to don protective clothing, conduct partial decontamination using organic assets, and continue operating their weapons in full protective clothing. Protection and casualty handling information is provided in Annex C.

Chemical Troop Training

51. The Engineering Faculty of the Red Banner Military Academy of Chemical Defense, *imeni* Marshal of the Soviet Union S. K. Timoshenko, in Moscow, offers a five-year program of study for chemical officers. This faculty provides the officers of the Chemical Troops with a fundamental education in the technical aspects of chemical and nuclear warfare. The five-year program emphasizes technical theories, concepts, and principles of chemical warfare, rather than tactics, specific munitions, and delivery systems. Upon graduation, Chemical Troop officers are assigned to chemical units at division level or higher throughout the armed forces to serve as commanders and deputy commanders.

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52. Personnel and units of the Chemical Troops in all services train regularly in nuclear/chemical reconnaissance (detection and identification); nuclear/chemical monitoring and analysis; and decontamination of personnel and equipment. Chemical Troop staffs and units support operational training of combat arms units through a variety of CBR support methods. Evidence exists that Chemical Troop units have conducted decontamination following chemical strikes. Taken together, the combat-support functions of the Chemical Troops are applicable to supporting operations in which Soviet nuclear and chemical strikes are executed, or supporting operations in which NATO nuclear and chemical strikes are employed.

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Offensive Training

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training for the offensive employment of chemical weapons may continue for individual officers, for some firing units, and for some staffs. Senior staff officers and commanders have been reported to receive instruction regarding the use of chemical weapons both at the Voroshilov General Staff Academy and in a special 10-week course at the Timoshenko Chemical Defense Academy. Junior- and middle-grade combat arms officers of all services are trained at the Chemical Defense Academy in a five-year course that covers those subjects necessary for the employment of chemical weapons.

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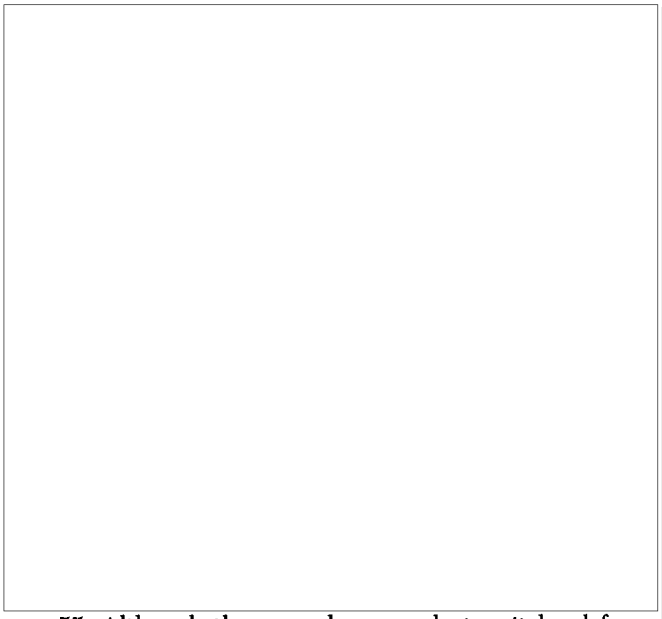

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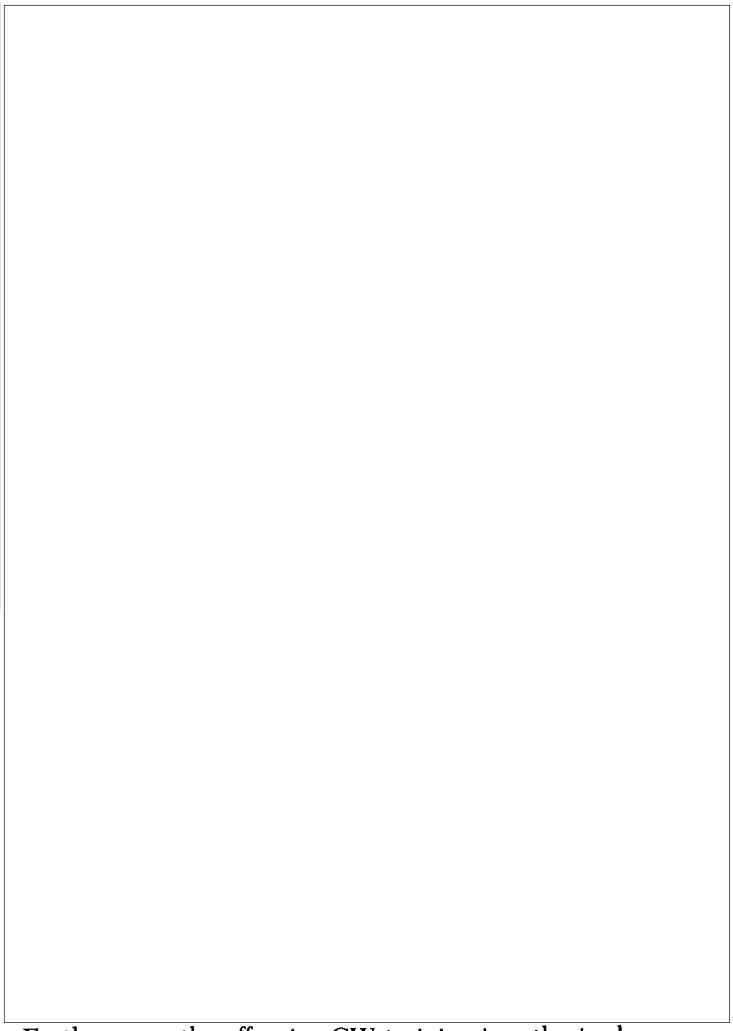

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55. Although the procedures used at unit level for firing guns, dropping bombs, or launching missiles for the delivery of chemical ordnance are virtually identical to the delivery of conventional ordnance, some evidence indicates that artillery units in the 8th Guards Army, GSFG, were required to perform chemical fire missions as part of their end-of-cycle qualifications in 1979. These qualifications are the culmination of the semiannual training cycle and test of the unit's ability to perform all its tasks. Other evidence indicates that a multiple rocket launcher (MRL) unit of the 20th Guards Army, GSFG, was actually conducting chemical fire-mission training during the portion of its semiannual training when it had previously been reported as conducting chemical protective training.

Furthermore, the offensive CW training is authorized and administered by front-, army-, and division-level commanders.

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BIOLOGICAL WARFARE PROGRAM

58. By the 1950s, the 7th Main Directorate of the Soviet Ministry of Defense had the responsibility for the BW program and established military microbiological research institutes near Sverdlovsk and Zagorsk. During the 1960s, industrial-scale production plants and storage facilities, called special storage areas or SSA were added to these institutes, giving them the ability to function as BW production plants. Also

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Medical

62. The adverse effects of a BW attack may be lessened by physical protection, by prior immunization to prevent a specific illness or lessen the severity of the disease, and by treatment with antibiotics or other therapeutics. The Soviet Union has continued to develop new vaccines, with more recent interest directed toward the exotic viruses, genetically engineered vaccines, and continued improvement of arboviruses vaccines. Among these are anthrax, smallpox, plague, cholera, tularemia, tickborne encephalitis, yellow fever, and typhoid vaccines, and staphylococcal and botulinum antitoxins.

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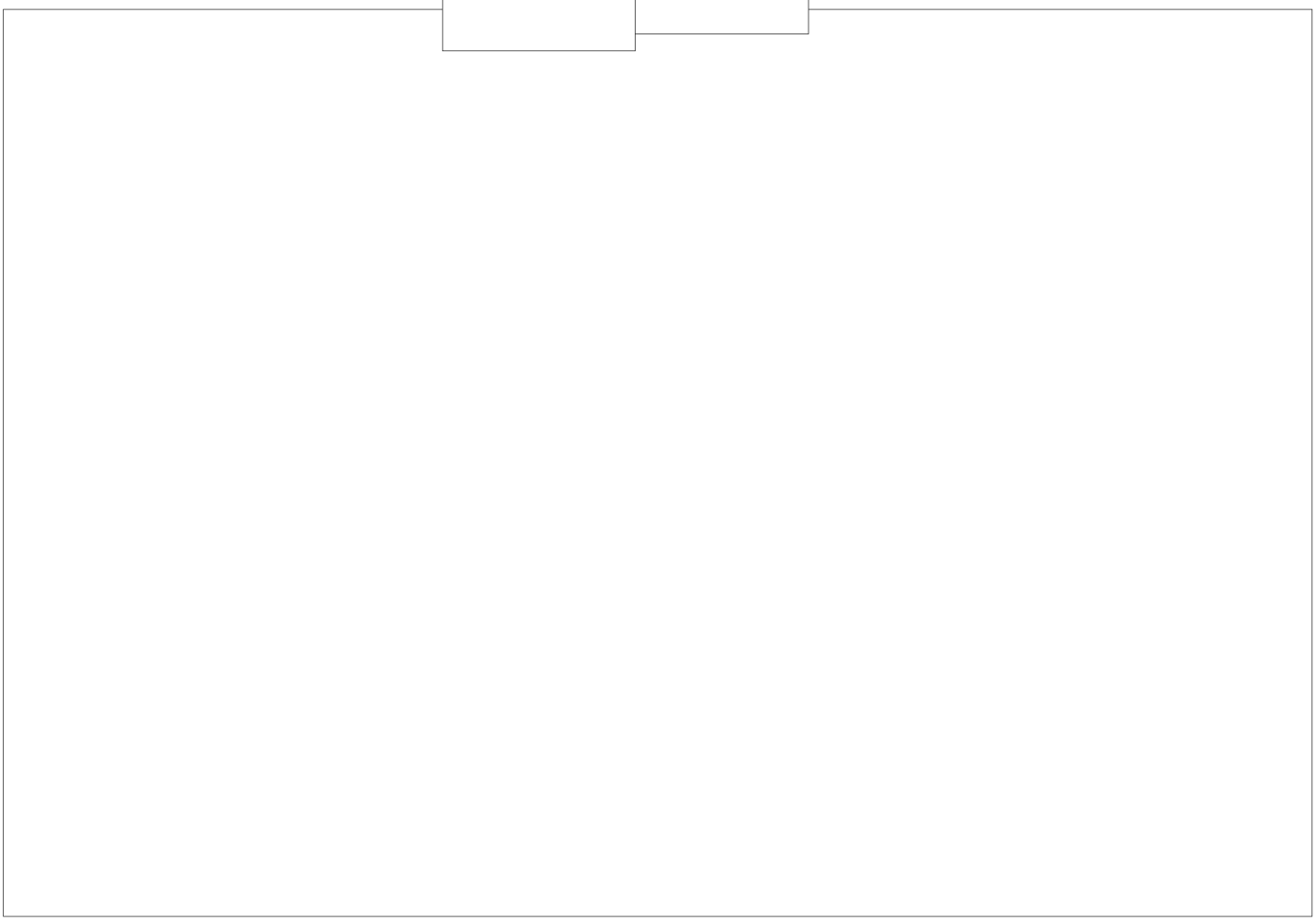

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63. The NSWP countries frequently collaborate on basic research and production of immunopreparations through the USSR Ministry of Health. The Soviets use inhalation and intranasal (aerosol) immunization methodologies to increase immunity for already vaccinated personnel. During the last five years, various Soviet prophylactic inhalation experiments have been conducted on humans against many diseases such as typhoid and paratyphoid, botulism, gas gangrene, plague, anthrax, tularemia, brucellosis, ornithosis, influenza, and tuberculosis. Over 10,000 people reportedly have been vaccinated using single and combined vaccine preparations. The effectiveness of these methods for primary vaccinations has not been demonstrated. At present in the Soviet Union, three types of vaccines are known and widely used against infectious diseases: (1) vaccines from live attenuated or noninfectious agents, called live vaccines; (2) vaccines that are suspensions of nonliving, pathogenic organisms, viruses, or rickettsiae, generally called dead vaccines, or inactivated vaccines; and (3) vaccines composed of antigens extracted from live organisms, called chemical vaccines.

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Protective

64. The Chemical Troops and the Medical Service assets of all the services are jointly responsible for detecting and identifying types of biological contamination, determining the extent of contamination and establishing procedures for the protection of personnel from the effects of biological agents. Medical Service personnel are responsible for monitoring epidemics of various types.

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65. Some level of protection from biological weapons effects on personnel is provided by the various individual and collective protection systems developed for protection against chemical agents.

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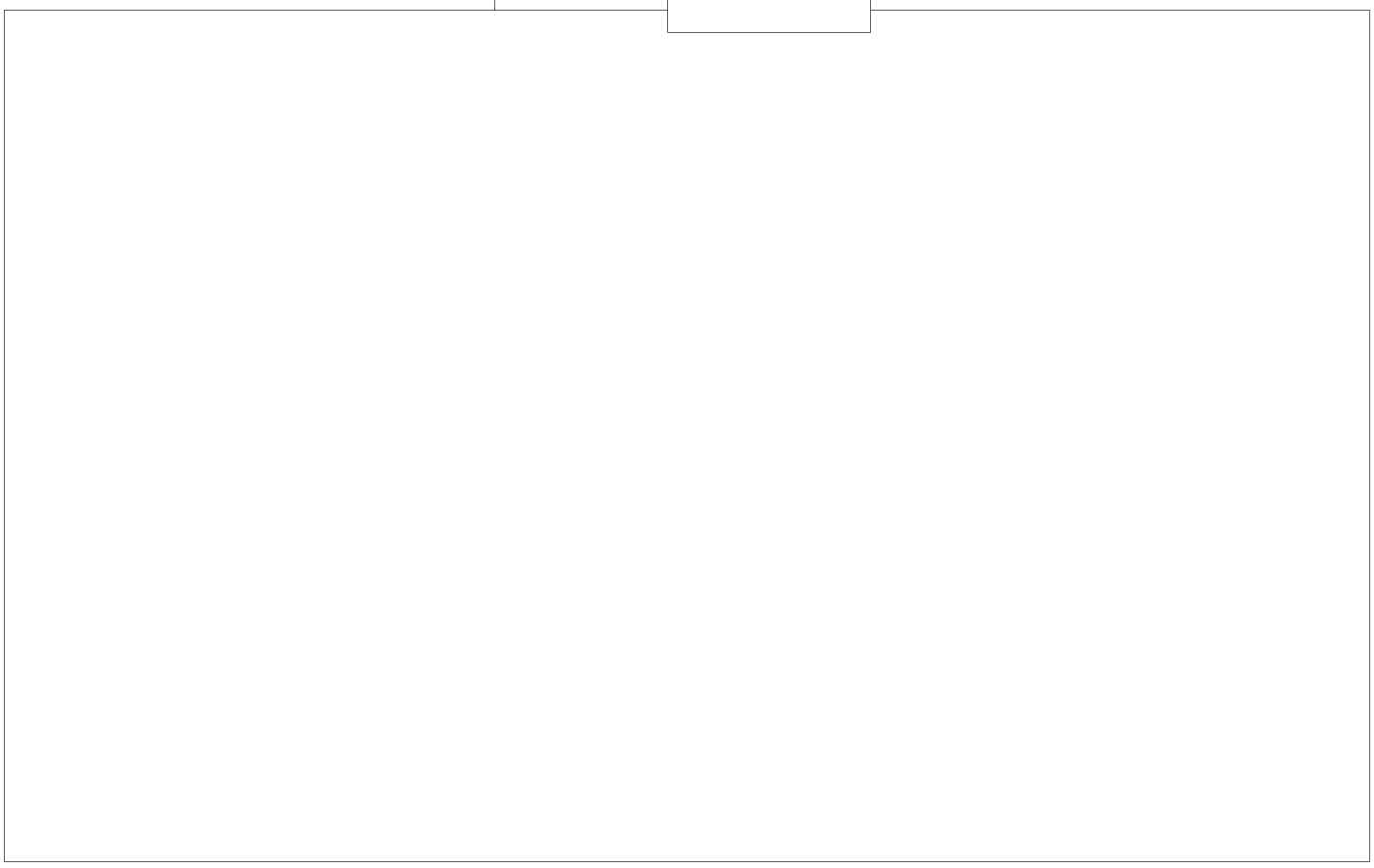

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According to doctrinal requirements, protective masks and clothing are to be used for biological warfare, which indicates that they provide a degree of protection.

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Offensive

66.

The Soviets generally consider infectious BW agents to be a weapon for use against selected targets, usually deep in the enemy's rear area. This indicates they may not foresee the use of infectious agents against enemy forces on the tactical battlefield. Alternatively, because of the lack of field detectors and the rapid onset of symptoms, toxin agents and possibly new biotechnologically derived compounds may represent tactical battlefield agents.

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Training for Military Operations

67. Pact CBR protective training encompasses a variety of actions taken to protect personnel from the effects of nuclear, chemical, and biological weapons. Many exercises portray specific scenarios involving nuclear or chemical contamination that results from the use of weapons of mass destruction. Other exercises, however, do not identify a specific type of contamination. Exercise activity in the mid-to-late 1970s portrayed Soviet units encountering a biological hazard and undergoing BW protective measures to restore combat capabilities following exposure to alleged NATO use of BW agent. General CBR protective training is considered by the Soviets to include protective measures against the effects of BW. We have no example of exercises that depict the offensive use of BW by the Soviets.

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RESEARCH AND DEVELOPMENT

68. In the early 1970s the Soviets embarked on a multifaceted research and development program designed to overcome a perceived significant US lead in chemical and biological warfare. They allocated almost $2 billion to this program to concentrate on emerging areas of science in search of significant breakthroughs that could result in a new generation of biological and chemical weapons to be fielded in the 1985-95 time frame. The program was also to improve the storage, effectiveness, deliverability, and safe handling of existing and emerging agents.

70. The Soviet CBW RDT&E Program is directed from the Council of Ministers. Responsibility for program direction is focused in the Ministry of Defense (MOD) with continuous oversight by the Scientific and Technical Council for Biological and Chemical Warfare. The military is involved at various civilian and military institutes in directing and conducting the actual research and development. The MOD tasks military institutes and laboratories directly, and contracts for studies in civilian institutes. Biomedical scientists from the military are assigned throughout the complex of either military or civilian research facilities with BW interest. Although the conventional Soviet BW program is reported to have been initiated in the 1930s in response to perceived external threats, it has always included emphasis on offensive weapons. The program also directs research on protective products such as detection systems and immunizations.

71. Responsibility for development and acquisition of offensive and protective CW systems and equipment is delegated to the Scientific Research Chemistry Institute (NIKhI), subordinate to the Directorate for Chemical Troops (UKhV) of the Ministry of Defense. NIKhI was located in Moscow until the late 1960s, then moved to the Central Chemical Proving Ground at Shikhany This institute is responsible for the acquisition, testing, and weapon integration of all CW equipment and materials, including chemical products used as chemical agents. Research on toxicity, CW application capabilities, and testing of toxic chemical products is performed at NIKhI. Work not within the institute's capabilities is contracted to appropriate organizations of the Academies of Science (basic and theoretical research) or to organizations of the chemical industry (applied research, development, and production) (RD&P). NIKhI departments that have the responsibility for the entire CW R&D program, including flame, obscurants, and smoke. We believe that portions of the test range are controlled and operated by the various departments within NIKhI.

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[3] Hetero-organic compounds contain a bond between carbon and a nontypically organic element such as silicon. Candidate agents are bicyclic phosphates, silatranes, and fentanyl derivatives. (U)

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Biotechnologically Derived Agents

75. Soviet research institutes believed to be engaged in the development of biotechnologically derived BW agents are the All Union Scientific Research Institute of Molecular Biology (IMB Kol'tsovo) and the All Union Scientific Research Institute for Applied Microbiology (IAM Serpukhov).

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Both institutes have large research, production, and storage facilities and each could have a work force of 5,000 personnel when completed. Although

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77. We believe that the Soviet new CBW agent program has progressed from the basic research and development phase into preliminary aspects of production, testing, and weaponization. We believe further that the first set of new agents are now progressing under joint auspices of the Chemical and Microbiological Industries. We believe testing may be under way at Shikhany, and associate some of the recent expansion at Shikhany with the new agent program.

we believe that Soviet military planners in the early 1970s decided to shift the emphasis of their CBW programs toward biotechnologically derived agents. This shift was gradual in order to accommodate the RDT&E time required for this agent development program.

79. We believe that the future Soviet military threat from infectious agents will come from naturally occurring organisms that have been genetically altered to enhance weaponization potential. Technological advances in the 1970s and 1980s have significantly reduced the difficulty of producing effective biological weapons and have allowed the optimization of agents for effectiveness by deliberate genetic manipulation, a much more certain process than selection of natural agents that marked the period from 1940 to 1960. The Soviets report extensive research on microbiological agents, including pathogenic bacteria, rickettsia, and viruses, which have potential application for BW weaponization. The Soviets have the capability to use some toxins at present, and we believe that additional toxins are being developed for offensive purposes. Toxins will not replace existing CBW weapons, but are part of a spectrum of threat agents. We believe that the Soviets are conducting research to expand their capability to conduct CBW operations employing toxins, and we believe that the composition and magnitude of the toxin threat will change in the future as research and development continues. The diversity of potential agents and the fluidity of the threat may require development of generic, rather than agent-specific, countermeasures. Evidence supports the US charge that the Soviets supplied the Vietnamese with the toxin agents used in Laos and Cambodia. Vegetation samples from the early 1980s attack sites and biomedical samples (blood, urine, and/or tissue) have shown the presence of unusually high concentrations of trichothecene mycotoxins.

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Western Technology

80. Acquisition of Western technology has been central to the rapid progress of biotechnology development in the USSR. In the last decade the United States has been increasingly supplanted by other Western nations as the principal supplier of research equipment and materials. Curtailment of technology transfer from the United States might slightly slow research progress, but would not prove a serious impediment.

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84. The Soviet's well-supported R&D program for protective measures has potential for significant breakthroughs. The rapid advances in the fields of genetic engineering and biotechnology will have considerable impact on the development of medical protection against agents of biological origin, including antidotes and prophylactics. Recent emphasis in Soviet personal protection research has been directed to the development of oxygen generating devices. The Soviets are currently testing the duration of these devices to increase the range of oxygen generation from its current limit of 45 minutes to two hours. Also, the Soviets are conducting research in filtration techniques and methods that could provide an innovative form of CBW protection against specific agents. Extensive research is being conducted in the area of chemically active protective methods such as Petryanov fibers, ion exchange, and catalytic filtration for removal of both vapors and aerosols. Future mask and collective protection filters may be smaller and more efficient, and modifications of the polymers used in the Petryanov filters are being researched to improve their thermal resistance and mechanical integrity. Impermeable impregnated types of protective clothing remain the mainstays of the Pact countries. This clothing is available in a large variety of overgarments, boots, and gloves and is designed for diverse uses. Although impermeable clothing cannot be worn for extended periods in warm weather due to heat stress, the Warsaw Pact is attempting to develop lighter weight overgarments.

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83. Improvements in the accuracy and reliability of current and future Soviet weapon systems would further enhance their capability to deliver chemical munitions.

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ANNEX A

GLOSSARY

CW Agents

1. Chemical agents are nonliving toxic substances produced through industrial processes. The initial chemical agents were industrial gases, such as chlorine, phosgene, and various irritants and toxics. In the latter part of World War I, mustard was used, and presented for the first time both contact and vapor hazards. Traditional chemical agents remained practically unchanged until the development of nerve agents in the 1940s. Nerve agents act rapidly because of their primary action on the nervous system and present both a vapor and a contact hazard. During this same era, cyanogen chloride and phosgene oxime were developed to improve blood and blister agent capability. The latter agent has a rapid decomposition rate. The most recently developed of the agents are the hallucinogenic compounds (BZ and LSD derivatives) and the antiplant agents (herbicides).

Common riot control agents, which are used worldwide by police forces, are not considered to be chemical agents. These agents can be developed, produced, and used in a manner whose origins would be virtually impossible to prove.

BW Agents

2. Biological agents are defined as living organisms that produce their effects by reproduction in their environment. Biological agents cause illness except when used in the antimateriel role, where the effect is deterioration. Since ancient times military leaders have been concerned with the impact of natural disease on operations. In early programs, biological agents were isolated from the natural environment and grown in an industrial setting. An early specialization in BW exploited active products of living organisms. Some micro-organisms, like some of the higher plants and animals, produce nonliving substances that affect living organisms (sometimes lethally). These products of living organisms are called either toxins, or, simply, metabolic byproducts.

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Toxins

3. Toxins are produced, extracted, and concentrated from large quantities of living materials, or, as with exotoxins, extracted from the medium in which these organisms are grown. Toxins or venoms not normally found in humans can be derived from other organisms such as bacteria, fungi, plants, and some animals, including their altered or synthesized forms.

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New Agents

4. Current advances in science, particularly biotechnology, increase significantly the number and variety of potential CBW agents while making large-scale production of the different agents more feasible. The theoretically possible new agents are in four categories:

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infectious agents that are naturally occurring but have been modified to enhance their militarily favorable characteristics; (3) naturally occurring compounds, their active fragments, or similar compounds that affect the normal physiology of the attacked organism in a predictable manner; and (4) toxin agents that are nonliving chemical substances of biological origin, or synthetic analogs or derivatives, which, in sufficient concentration, can adversely affect a living organism. Toxins or venoms not normally found in humans can be derived from other organisms such as bacteria, fungi, plants, and some animals, including their altered or synthesized forms.

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CBW Applications

5. Chemical and biological agents and weapons demonstrate versatility and may be used against a wide variety of strategic, operational, and tactical objectives. Their use depends on the target as well as the characteristics of the agent to be employed. Biological agents may be employed against economic targets

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or populations either prior to military action or independent of military action.

Antihuman CBW Applications

6. Humans are especially vulnerable to attack by chemical and biological agents, and a wide variety of CBW agents and weapons have been developed. CBW agents can cause effects ranging from death to varying degrees of physical and mental incapacitation.

Antianimal CBW Applications

7. Animals are also vulnerable to CBW attacks. Various animal disease organisms can be employed as BW agents that cause death, incapacitation, or failure to grow and thrive. Chemical agents such as mustard and the nerve agents affect animals in the same manner as they affect humans.

Anticrop CBW Applications

8. There are both chemical and biological antiplant agents. The primary CW agents are defoliants and herbicides that kill or inhibit the growth of plants and render the soil unsuitable for plants for a variable period of time. The primary antiplant BW agents are living organisms that cause disease only in certain kinds of plants. The objective of an antiplant attack is a nation's economy and its ability to wage war through its food supplies. Defoliants, herbicides, and some biologically based growth regulators that are widely used in agricultural, forestry, and weed-control activities by all developed nations are not considered as anticrop agents. US policy defines only those agents that have been purposely designed or enhanced to attack a nation's economy through its food supplies as anticrop agents.

Antimateriel CBW Applications

9. Various chemical and biological agents could be used against materiel, including fuel supplies. Chemical agents could directly attack the structural integrity of various materials. Corrosive materials can degrade electrical components, rubber, and perhaps even some metals. The objective of antimateriel attacks is degradation of the materiel with which the enemy conducts war. Communication equipment, vehicles, and aircraft theoretically could be rendered inoperative or hazardous to their operators because of the use of chemical weapons or decontaminants.

Persistent Versus Nonpersistent

10. Persistent and nonpersistent are subjective terms used to describe the duration of military effectiveness of the chemical or biological agent. Duration is generally dependent upon physical and chemical properties of the agent, weather, method of dissemination, and terrain conditions. Generally a persistent agent remains effective for a relatively long time (hours to months) while a nonpersistent agent is effective for only a short time (minutes to hours).

CBW Protection

11. CBW protection includes detection, protection, and recovery from the effects of the use of chemical, toxin, or biological weapons. Detection involves determining that a CBW attack has occurred, and using CBR reconnaissance means to predict/plot the spread of contamination and its effect on the operations of your forces. Protection includes both individual and collective protection against the effects of CBW agents in order to enable personnel to operate in a contaminated environment. Recovery includes the decontamination/disinfection of personnel, equipment, and terrain that has been contaminated in order to allow operations unencumbered by protective equipment. In order for CBW defense to be effective, units and individuals must be thoroughly trained and properly equipped.

Genetic Engineering

12. Capability to modify the genetic characteristics of cells or organisms at the molecular level.

Recombinant DNA/Genetics

13. A specialized area of genetic engineering in which new genetic material is placed into (chemically recombined into) a host organism in order to alter that organism's properties.

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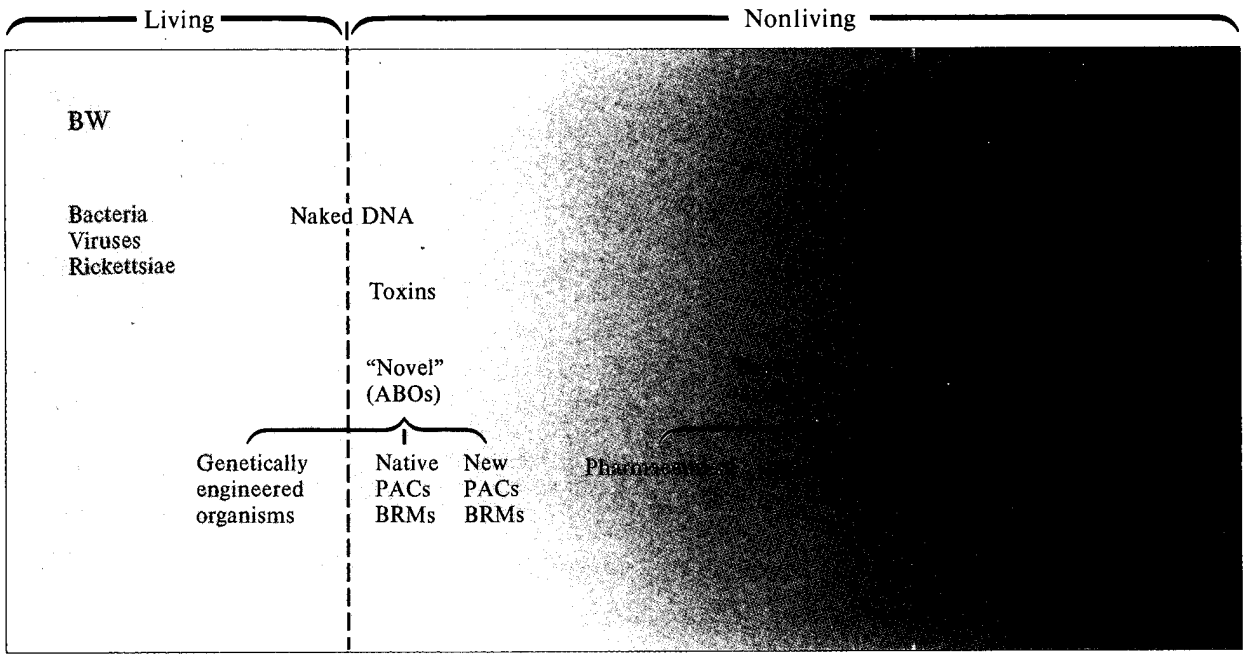
Figure 13
BCW Threat Spectrum



ABO=Agents of Biologic Origin
PAC=Physiologically Active Compounds
BRM=Biological Response Modifiers

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14. Biotechnologically derived CBW agents comprise two distinct classes or groups of agents (see figure 13):

— Infectious agents and those genetically enhanced to increase their potential for weaponization, or organisms into which the biological elements to produce a foreign substance have been introduced.

— Bioregulators, toxins, venoms, and their biologically active subfractions, produced through genetic engineering/biotechnical means.

15. Bioregulators are compounds that are essential for the normal psychological and physiological functions of a living organism. They can cause a wide range of harmful effects if introduced at higher-than-normal concentrations or following genetic or chemical manipulations.

Massive Use

16. We believe that the Soviets earlier (in the 1950s and 1960s) planned for the large-scale employment of chemical weapons, in part as substitutes for an insufficient number of nuclear weapons, and to make up for the inaccuracy of other weapons systems. Such use apparently envisioned massed strikes (using as many weapons as necessary to achieve the required levels of agent concentration) on hundreds of targets throughout the depth and breadth of the battlefield and into the operational depth of the enemy. While chemical weapons were not necessarily the best munitions to use against many of the targets, apparently they were believed to be the best weapons available at the time. We do not know how close the Soviets came to being able to accomplish such large-scale use of CW.

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Selective Use

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17. We believe that, with the increase in the quantity of battlefield nuclear weapons and the improved accuracy, range, and lethality of conventional weapons, the Soviets have adopted the concept of selective use (vyborochnoye primeneniye) of chemical weapons,

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though we do not know how the Soviets define this in relation to CW. For the purposes of this NIE, selective use refers to employment of CW on a smaller scale and against more carefully selected targets, in conjunction with other means of destruction, to achieve the desired casualty or contamination results. Chemical strikes on the selected targets will still employ the massed application of agent to achieve the levels of concentration required in Soviet norms.

Warm-Base Production Capability

18. In a warm-base production capability mode, the production plant is not actually producing agent. The production equipment, however, is being constantly maintained. Active periodic equipment surveillance is performed, which may include running pumps, turning valves, and purging pipes of condensation. Equipment repairs are performed as needed.

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ANNEX B

SOVIET CHEMICAL WARFARE AGENTS

In terms of tactical purpose, the Soviets divide toxic agents into groups according to the nature of their action: lethal, incapacitants, irritants, and training. In terms of physiological action on the organism, the Soviets make the following distinctions:

(a) Neuroparalytic action: GA (tabun), GB (sarin), GD (soman), and VX.

(b) Skin-blistering: H (commercial sulfur mustard), HD (distilled mustard), HT and HQ (mustard formulas), HN (nitrogen mustard), and L (Lewisite).

(c) General toxic action: AC (prussic acid), CK (cyanogen chloride).

(d) Suffocating: CG (phosgene).

(e) Psychochemical: BZ.

(f) Irritants: CN (chloracetophenone), DM (adamsite), CS, and CR.

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ANNEX C

PROTECTION AND CASUALTY HANDLING

Personal Protection

Protective Mask

1. The current Soviet standard-issue mask (ShLEM) effectively protects against known CBW agents. A new mask is replacing this mask and provides increased protection. Special versions have been made for communication, for accommodation of eye lenses, and for casualties with head wounds. Efforts to improve the mask are continuing, and reports persist that a secret gas mask exists to be issued only in wartime that may have a changeable, cheek-mounted filter.

Protective Clothing

2. Soviet individual protective clothing is effective in providing protection against chemical agents in vapor, aerosol, and liquid form. The protection requires wearing an ensemble of chemically impregnated underclothing, impermeable overgarments, buskins, and gloves, in addition to the mask. The Soviets are aware of the limitations of their impermeable clothing. It causes heat stress and reduces mobility and dexterity, as well as combat activity.

3. The Soviets are conducting research in semipermeable films, ionexchange fibers, and activated carbon fiber technology associated with individual protective clothing. They also continuously monitor similar research in non-Communist countries but have not found a film or fiber material that is better than butyl rubber to repel agents disseminated in liquid or solid form.

Decontamination

4. Partial individual decontamination is conducted on an emergency basis to allow the soldier to continue to fight and use his equipment. Complete decontamination is conducted by specialized units of the Chemical Troops when residual levels exceed minimal levels.

5. Personal decontamination kits are available to be issued to all soldiers. The unit supply includes collective protection kits for individual vehicles or shelters. Chemical defense units are issued larger pieces of equipment, which are designed for complete decontamination.

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6. The Warsaw Pact has a wide variety and large amount of decontamination equipment, which it continually upgrades and improves. The Pact emphasizes speed of decontamination, accepting partial decontamination, because they recognize that complete decontamination is virtually impossible to achieve and is seldom necessary. Weathering for short periods is often sufficient to reduce contamination to acceptable levels. Overzealous decontamination may make an item unusable, because most decontaminants are extremely corrosive.

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7. Future efforts appear to be directed toward contamination avoidance. This can be accomplished through agent-resistant coatings and improved detection capabilities. Some of the new agents may not be susceptible to decontamination by the available standard chlorine-based compounds. Even if new agents require new decontaminants, the equipment needed to apply the decontaminants probably would not change.

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Collective Protective Shelters

Ground Forces

8. The Soviets emphasize overpressure systems that have a centrifugal dust filter to remove particulates that might contaminate. The overpressure collective protection system also has a charcoal-based particulate and vapor filter. These are installed in almost all armored vehicles, artillery and missile system vehicles, combat support vans, and in civil defense shelters. For battlefield underground shelters, the Soviets have kits that consist of a filter system and an airtight door assembly. The kits may also be installed in buildings. Projected changes in protection systems include continued development of filters that absorb more toxic gases per unit of activated charcoal and providing new

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materials to resist new agents, prolonging operating life and reducing deterioration while in use.

Air Forces

9. CBR collective protection shelters are located at most operating Air Force bases. The older shelters were designed for eight to 30 people and are dispersed around the airfield work areas. Bases having underground command posts, alternate command posts, underground base operations centers, and flight crew centers with CBR filtration and hardening have also been identified. The newest shelters have airlocks.

Naval Forces

10. Most current Soviet naval surface combatants are provided with CBR protective citadels. The Soviets protect all manned spaces, and especially the bridge, fire control tower, major battle stations and magazines, communications spaces, central engine room control compartments, as well as medical stations. These protective citadels are provided with an overpressure system of filtered air that is generated by dedicated ventilation systems, or, in some cases, by the normal ventilation flow redirected through filters capable of removing toxic chemicals, radioactive particulates, or biological organisms. Additionally, the Soviets have incorporated rapid closing, remotely controlled, external hull fittings to protect many of their ships from CBR contamination.

11. Soviet surface combatants have extensive, well-designed water washdown systems for the protection of ship surfaces from CBR contamination. In addition to providing a seawater barrier to isolate the superstructure and deck from CBR agents, this system would also be used to assist in the decontamination of those areas following a CW, BW, or fallout attack. Improvements in seawater washdown systems include more uniform distribution of nozzles, greater portions of the superstructure covered by the resulting water barrier, and internal routing of water washdown supply piping.

Casualty Handling

12. Soviet medical tactics at lower echelons include minimal first aid and stabilization procedures and the assembly of wounded at collection points. Casualty decontamination is performed at regimental and division levels. According to Soviet doctrine, contaminated casualties enter a separate treatment and evacuation chain. Equipment and nonmedical personnel are assigned to the regiment level to provide "partial" personnel decontamination. Disinfection and decontamination platoons are organic to division level, and the decontamination capabilities of this level are described as "complete." A larger and more specialized medical staff operates in a clean area at the division level but maintains the primary function of receiving and sorting casualties. Only casualties who are expected to return to duty in 10 to 12 days remain at the division level, and those who require a longer period of convalescence are moved to specialized mobile field hospitals at Army level. Definitive care for casualties expected to recover within 30 days is provided at Army-level medical support elements. Others requiring longer treatment are evacuated to front level or higher.

13. There is little evidence that the Soviets provide for decontamination of large numbers of nonambulatory casualties or those with combined wounds. It is possible that Soviet policy is to categorize these casualties at regiment and division level. Such a policy, coupled with the well-defined provision for isolation of contaminated casualties, would substantially reduce the liability on the Soviet medical support system.

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